Guidelines for the Use of Antiretroviral Agents in Adults and Adolescents with HIV

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Appendix B, Table 3. Characteristics of Nucleoside Reverse Transcriptase Inhibitors (Last updated December 18, 2019; last reviewed December 18, 2019) (page 1 of 4)

The older NRTIs ddI and d4T are no longer commonly used in clinical practice and have been removed from this table. Please refer to the July 10, 2019, version of the guidelines (found in the archived guidelines section of AIDS*info*) or to the FDA product labels for ddI and d4T for information regarding these drugs.

Generic Name (Abbreviation) *Trade Name*	Formulations	Dosing Recommendations[a]	Elimination/ Metabolic Pathway	Serum/ Intracellular Half-Lives	Adverse Events[b]
Abacavir (ABC) *Ziagen* **Note:** Generic tablet formulation is available.	**Ziagen:** • 300 mg tablet • 20 mg/mL oral solution **Generic:** • 300 mg tablet • Also available as FDC with 3TC and ZDV/3TC **FDC Tablets that Contain ABC:**[c] • Epzicom (ABC/3TC) • Trizivir (ABC/ZDV/3TC) **STRs that Contain ABC:**[d] • Triumeq (DTG/ABC/3TC)	**Ziagen**: • ABC 600 mg once daily, *or* • ABC 300 mg twice daily See Appendix B, Tables 1 and 2 for dosing information for FDC tablets that contain ABC.	Metabolized by alcohol dehydrogenase and glucuronyl transferase 82% of ABC dose is excreted renally as metabolites Dose adjustment is recommended in patients with hepatic insufficiency (see Appendix B, Table 10).	1.5 hours/12–26 hours	Patients who test positive for HLA-B*5701 are at the highest risk of experiencing HSRs. HLA screening should be done before initiating ABC. For patients with a history of HSRs, rechallenge **is not recommended**. Symptoms of HSRs may include fever, rash, nausea, vomiting, diarrhea, abdominal pain, malaise, fatigue, or respiratory symptoms (e.g., sore throat, cough, or shortness of breath). Some cohort studies suggest an increased risk of MI with recent or current use of ABC, but this risk is not substantiated in other studies.
Emtricitabine (FTC) *Emtriva*	**Emtriva:** • 200 mg hard gelatin capsule • 10 mg/mL oral solution **FDC Tablets that Contain FTC:**[c] • Descovy (TAF/FTC) • Truvada (TDF/FTC) **STRs that Contain FTC:**[d] • Atripla (EFV/TDF/FTC) • Biktarvy (BIC/TAF/FTC) • Complera (RPV/TDF/FTC) • Genvoya (EVG/c/TAF/FTC) • Odefsey (RPV/TAF/FTC) • Stribild (EVG/c/TDF/FTC) • Symtuza (DRV/c/TAF/FTC)	**Emtriva** *Capsule:* • FTC 200 mg once daily *Oral Solution:* • FTC 240 mg (24 mL) once daily See Appendix B, Tables 1 and 2 for dosing information for FDC tablets that contain FTC.	86% of FTC dose is excreted renally See Appendix B, Table 10 for dosing recommendations in patients with renal insufficiency.	10 hours/>20 hours	Minimal toxicity Hyperpigmentation/skin discoloration Severe acute exacerbation of hepatitis may occur in patients with HBV/HIV coinfection who discontinue FTC.

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Generic Name (Abbreviation) *Trade Name*	Formulations	Dosing Recommendations[a]	Elimination/ Metabolic Pathway	Serum/ Intracellular Half-Lives	Adverse Events[b]
Lamivudine (3TC) *Epivir* **Note:** Generic products are available.	**Epivir:** • 150 and 300 mg tablets • 10 mg/mL oral solution **Generic:** • 150 and 300 mg tablets • Also available as FDC with ABC and ZDV **FDC Tablets that Contain 3TC:[c]** • Cimduo (TDF/3TC) • Combivir (ZDV/3TC) • Epzicom (ABC/3TC) • Temixys (TDF/3TC) • Trizivir (ABC/ZDV/3TC) **STRs that Contain 3TC:[d]** • Delstrigo (DOR/TDF/3TC) • Dovato (DTG/3TC) • Symfi (EFV 600 mg/ TDF/3TC) • Symfi Lo (EFV 400 mg/ TDF/3TC) • Triumeq (DTG/ABC/3TC)	**Epivir:** • 3TC 300 mg once daily, *or* • 3TC 150 mg twice daily See Appendix B, Tables 1 and 2 for dosing information for FDC tablets that contain 3TC.	70% of 3TC dose is excreted renally See Appendix B, Table 10 for dose recommendations in patients with renal insufficiency.	5–7 hours/18–22 hours	Minimal toxicity Severe acute exacerbation of hepatitis may occur in patients with HBV/HIV coinfection who discontinue 3TC.
Tenofovir Alafenamide (TAF) *Vemlidy* **Note:** Vemlidy is available as a 25-mg tablet for the treatment of HBV.	**FDC Tablets that Contain TAF:[c]** • Descovy (TAF/FTC) **STRs that Contain TAF:[d]** • Biktarvy (BIC/TAF/FTC) • Genvoya (EVG/c/TAF/FTC) • Odefsey (RPV/TAF/FTC) • Symtuza (DRV/c/TAF/FTC)	See Appendix B, Tables 1 and 2 for dosing information for FDC tablets that contain TAF.	Metabolized by cathepsin A. See Appendix B, Table 10 for dosing recommendations in patients with renal insufficiency.	0.5 hours/150–180 hours	Renal insufficiency, Fanconi syndrome, and proximal renal tubulopathy are less likely to occur with TAF than with TDF. Osteomalacia and decreases in BMD are less likely to occur with TAF than with TDF. Severe acute exacerbation of hepatitis may occur in patients with HBV/HIV coinfection who discontinue TAF. Diarrhea, nausea, headache

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Generic Name (Abbreviation) *Trade Name*	Formulations	Dosing Recommendations[a]	Elimination/ Metabolic Pathway	Serum/ Intracellular Half-Lives	Adverse Events[b]
Tenofovir Disoproxil Fumarate (TDF) *Viread* **Note:** Generic product is available.	**Viread:** • 150, 200, 250, and 300 mg tablets • 40 mg/g oral powder **Generic:** • 300 mg tablet **FDC Tablets that Contain TDF:**[c] • Cimduo (TDF/3TC) • Temixys (TDF/3TC) • Truvada (TDF/FTC) **STRs that Contain TDF:**[d] • Atripla (EFV/TDF/FTC) • Complera (RPV/TDF/FTC) • Delstrigo (DOR/TDF/3TC) • Stribild (EVG/c/TDF/FTC) • Symfi (EFV 600 mg/ TDF/3TC) • Symfi Lo (EFV 400 mg/ TDF/3TC)	**Viread:** • TDF 300 mg once daily, *or* • 7.5 level scoops of oral powder once daily (dosing scoop dispensed with each bottle; one level scoop contains 1 g of oral powder). Mix oral powder with 2–4 ounces of a soft food that does not require chewing (e.g., applesauce, yogurt). **Do not mix oral powder with liquid.** See Appendix B, Tables 1 and 2 for dosing information for FDC tablets that contain TDF.	Renal excretion is the primary route of elimination. See Appendix B, Table 10 for dose recommendations in patients with renal insufficiency.	17 hours/>60 hours	Renal insufficiency, Fanconi syndrome, proximal renal tubulopathy Osteomalacia, decrease in BMD Severe acute exacerbation of hepatitis may occur in patients with HBV/HIV coinfection who discontinue TDF. Asthenia, headache, diarrhea, nausea, vomiting, flatulence
Zidovudine (ZDV) *Retrovir* **Note:** Generic products are available.	**Retrovir:** • 100 mg capsule • 10 mg/mL IV solution • 10 mg/mL oral solution **Generic:** • 300 mg tablet • Also available as FDC with 3TC and 3TC/ABC **FDC Tablets that Contain ZDV:**[c] • Combivir (ZDV/3TC) • Trizivir (ABC/ZDV/3TC)	**Retrovir:** • ZDV 300 mg twice daily, *or* • ZDV 200 mg three times a day See Appendix B, Table 2 for dosing information for FDC tablets that contain ZDV.	Metabolized to GAZT Renal excretion of GAZT See Appendix B, Table 10 for dosing recommendations in patients with renal insufficiency.	1.1 hours/ 7 hours	Macrocytic anemia Neutropenia Nausea, vomiting, headache, insomnia, asthenia Nail pigmentation Lactic acidosis/severe hepatomegaly with hepatic steatosis (this is a rare, but potentially life-threatening, toxicity) Hyperlipidemia Insulin resistance/diabetes mellitus Lipoatrophy Myopathy

Appendix B, Table 3. Characteristics of Nucleoside Reverse Transcriptase Inhibitors (Last updated December 18, 2019; last reviewed December 18, 2019) (page 4 of 4)

[a] For dose adjustments in patients with renal or hepatic insufficiency, see Appendix B, Table 10. When no food restriction is listed, the ARV drug can be taken with or without food.

[b] Also see Table 17.

[c] See Appendix B, Table 2 for information about these formulations.

[d] See Appendix B, Table 1 for information about these formulations.

Key: 3TC = lamivudine; ABC = abacavir; BIC = bictegravir; BMD = bone mineral density; CrCl = creatinine clearance; d4T = stavudine; ddI = didanosine; DOR = doravirine; DRV/c = darunavir/cobicistat; DTG = dolutegravir; EC = enteric coated; EFV = efavirenz; EVG/c = elvitegravir/cobicistat; FDC = fixed-dose combination; FDA = Food and Drug Administration; FTC = emtricitabine; GAZT = azidothymidine glucuronide; HBV = hepatitis B virus; HLA = human leukocyte antigen; HSR = hypersensitivity reaction; IV = intravenous; MI = myocardial infarction; RPV = rilpivirine; STR = single-tablet regimen; TAF = tenofovir alafenamide; TDF = tenofovir disoproxil fumarate; WHO = World Health Organization; ZDV = zidovudine